

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims:

1           1.       (Currently Amended) A method of processing traffic received from  
2       an InfiniBand node via a first queue pair, comprising:  
3           selecting a traffic entry in an InfiniBand receive queue, wherein said traffic  
4       entry comprises one of:  
5           a Send command comprising an encapsulated communication;  
6           a Send command comprising an RDMA Read descriptor; and  
7           an RDMA Read response comprising a response to an RDMA  
8       Read request;  
9           if said selected traffic entry comprises a Send command comprising an  
10      RDMA Read descriptor:  
11           issuing a first RDMA Read request to retrieve one or more portions  
12          of a communication described by said RDMA Read descriptor;  
13           in a linked list corresponding to the first queue pair, adding an  
14          entry corresponding to said first RDMA Read request, said entry  
15          comprising a first sequence number and a last sequence number that  
16          identify a range of sequence numbers associated with expected responses  
17          to said first RDMA Read request and optionally comprising a sequence  
18          number of the most recently received response or a link to the next entry of  
19          in the linked list identifying a range of sequence numbers associated with  
20          expected responses to said first RDMA Read request; and  
21          in a retry queue, adding an entry corresponding to said first RDMA

22 Read request; and  
23 if said selected traffic entry comprises an RDMA Read response to said  
24 first RDMA Read request:  
25 identifying a sequence number associated with said RDMA Read  
26 response;  
27 comparing said sequence number to said range of sequence  
28 numbers;  
29 storing said one or more portions of said described communication  
30 to facilitate assembly of said described communication in said queue; and  
31 if said sequence number matches a final sequence number in said  
32 range, retiring in said retry queue said entry corresponding to said first  
33 RDMA Read request.

1 2. (Original) The method of claim 1, further comprising:  
2 forwarding a communication associated with said selected traffic entry, for  
3 transmission on an external communication link, wherein said communication is  
4 one of:  
5 said encapsulated communication; and  
6 said described communication, after said described communication  
7 is assembled.

1 3. (Original) The method of claim 1, further comprising, if said  
2 selected traffic entry comprises an RDMA Read response to said first RDMA  
3 Read request:  
4 if said sequence number does not match said final sequence number,  
5 updating said entry in said linked list to include said sequence number.

1 4. (Original) The method of claim 1, further comprising:

2 maintaining a single memory structure comprising multiple linked list,  
3 including said linked list;  
4 wherein each linked list stores entries associated with RDMA Read  
5 requests for a different InfiniBand queue pair.

1 5. (Original) The method of claim 1, further comprising:  
2 maintaining a single memory structure for queuing InfiniBand traffic  
3 received via multiple virtual lanes and multiple queue pairs, said single memory  
4 structure comprising said queue.

1 6. (Original) The method of claim 5, wherein said queue comprises a  
2 linked list of memory buffers within said single memory structure.

1 7. (Original) The method of claim 1, further comprising:  
2 maintaining a head pointer configured to identify a head of said linked list;  
3 and  
4 maintaining a tail pointer configured to identify a tail of said linked list.

1 8. (Currently Amended) The method of claim 1, further comprising:  
2 maintaining a head pointer configured to identify a head of said queue;  
3 maintaining a tail pointer configured to identify a tail of said queue; and  
4 maintaining a next traffic entry pointer configured to identify a next entry  
5 in said queue to be processed ~~after said forwarding~~.

1 9. (Original) The method of claim 8, wherein said tail pointer is  
2 configured to identify where in said queue a next traffic entry is to be queued.

1 10. (Original) The method of claim 1, further comprising, if said

2 selected traffic entry comprises an RDMA Read descriptor;  
3 appending space to a head of said queue;  
4 wherein said described communication is assembled in said appended  
5 space.

1 11. (Original) The method of claim 1, further comprising, if said  
2 selected traffic entry comprises an RDMA Read response to said first RDMA  
3 Read request:  
4 dropping an RDMA Read response received out of order; and  
5 requesting a retry of said first RDMA Read request.

1 12. (Currently Amended) A computer readable medium storing  
2 instructions that, when executed by a computer, cause the computer to perform a  
3 method of processing traffic received from an InfiniBand node via a first queue  
4 pair, the method comprising:  
5 selecting a traffic entry in an InfiniBand receive queue, wherein said traffic  
6 entry comprises one of:  
7 a Send command comprising an encapsulated communication;  
8 a Send command comprising an RDMA Read descriptor; and  
9 an RDMA Read response comprising a response to an RDMA  
10 Read request;  
11 if said selected traffic entry comprises a Send command comprising an  
12 RDMA Read descriptor:  
13 issuing a first RDMA Read request to retrieve one or more portions  
14 of a communication described by said RDMA Read descriptor;  
15 in a linked list corresponding to the first queue pair, adding an  
16 entry corresponding to said first RDMA Read request, said entry  
17 comprising a first and a last sequence numbers that identify a range of

18 sequence numbers associated with expected responses to said first RDMA  
19 Read request and optionally comprising a sequence number of the most  
20 recently received response or a link to the next entry of in the linked list  
21 identifying a range of sequence numbers associated with expected  
22 responses to said first RDMA Read request; and  
23 in a retry queue, adding an entry corresponding to said first RDMA  
24 Read request; and  
25 if said selected traffic entry comprises an RDMA Read response to said  
26 first RDMA Read request:  
27 identifying a sequence number associated with said RDMA Read  
28 response;  
29 comparing said sequence number to said range of sequence  
30 numbers;  
31 storing said one or more portions of said described communication  
32 to facilitate assembly of said described communication in said queue; and  
33 if said sequence number matches a final sequence number in said  
34 range, retiring in said retry queue said entry corresponding to said first  
35 RDMA Read request.

1 13. (Currently Amended) A method of tracking responses to an RDMA  
2 Read operation, the method comprising:  
3 issuing an RDMA Read on a first communication connection;  
4 identifying a range of sequence numbers to be associated with responses to  
5 the RDMA Read;  
6 adding an entry to a first linked list corresponding to the first  
7 communication connection, said entry comprising configured to identify:  
8 a first and a last sequence numbers that identify said range of  
9 sequence numbers; and

10                   a latest sequence number received in said range of sequence  
11                   numbers;  
12                   optionally a link to the next entry of in the linked list;  
13                   receiving a first RDMA Read response;  
14                   determining whether a first sequence number associated with the first  
15 RDMA Read response matches a last sequence number in said range of sequence  
16 numbers; and  
17                   if said first sequence number does not match said last sequence number,  
18 updating said latest sequence number to match said first sequence number.

1           14.     (Original) The method of claim 13, further comprising:  
2                   if said first sequence number matches said last sequence number, retiring  
3                   an entry in a retry queue corresponding to the RDMA Read.

1           15.     (Original) The method of claim 13, wherein the first  
2                   communication connection is an InfiniBand queue pair.

1           16.     (Original) The method of claim 15, wherein:  
2                   said issuing is performed by an InfiniBand transmit module; and  
3                   said adding, said determining and said updating are performed by an  
4                   InfiniBand receive module;  
5                   the method further comprising:  
6                   at the InfiniBand transmit module, retrying the RDMA Read if an RDMA  
7                   Read response associated with said range of sequence numbers is received out of  
8                   order.

1           17.     (Original) The method of claim 15, wherein:  
2                   said issuing is performed by an InfiniBand transmit module; and

3           said adding, said determining and said updating are performed by an  
4   InfiniBand receive module;  
5           the method further comprising, at the InfiniBand transmit module:  
6                 maintaining a retry queue for tracking RDMA Reads that have not  
7                 yet completed; and  
8                 retiring an entry in said retry queue corresponding to the RDMA  
9                 Read if RDMA Read responses corresponding to said range of sequence  
10                numbers are received in order.

1           18.     (Original) The method of claim 17, further comprising, at the  
2   InfiniBand transmit module:  
3                 retrying the RDMA Read if RDMA Read responses corresponding to one  
4                 or more of said range of sequence numbers are received out of order.

1           19.     (Original) The method of claim 13, wherein said identifying  
2   comprises:  
3                 dividing an amount of data to be received in response to the RDMA Read  
4                 by a maximum transfer unit in effect for the first communication connection.

1           20.     (Original) The method of claim 13, further comprising:  
2                 maintaining a single memory structure comprising multiple linked lists  
3                 corresponding to multiple communication connections, including said first linked  
4                 list corresponding to the first communication connection.

1           21.     (Original) The method of claim 20, further comprising:  
2                 for each of the multiple communication connections, including the first  
3                 communication connection, maintaining pointers to the first entry and the last  
4                 entry in the corresponding linked list.

1           22.     (Original) An apparatus for queuing multiple types of receive  
2 traffic in a communication interface, comprising:  
3           a queue for queuing multiple types of receive traffic associated with  
4 communications to be transmitted from the communication interface;  
5           a head pointer configured to identify a head of said queue;  
6           a tail pointer configured to identify a tail of said queue, wherein said  
7 traffic commands are enqueued at said tail;  
8           a next entry pointer configured to identify a next entry in said queue to be  
9 processed; and  
10          a linked list, wherein each entry in said linked list corresponds to an  
11 RDMA Read request issued by the communication interface, and is configured to  
12 identify a range of sequence numbers associated with expected responses to the  
13 RDMA Read request.

1           23.     (Original) The apparatus of claim 22, wherein each entry said  
2 linked list is further configured to identify a sequence number of a most recently  
3 received response to the RDMA Read request.

1           24.     (Original) The apparatus of claim 22, wherein the linked list is one  
2 of multiple linked lists, each said linked list corresponding to a separate  
3 InfiniBand queue pair.

1           25.     (Original) The apparatus of claim 22, further comprising:  
2           a retry queue, wherein a retry entry is added to said retry queue for each  
3 RDMA Read request issued by the communication interface;  
4           wherein a first retry entry in said retry queue corresponding to a first  
5 RDMA Read request is retired when said expected responses to the first RDMA



6 Read request are received.

1 26. (Original) The apparatus of claim 22, further comprising:  
2 a memory configured to store pointers to a first entry and a last entry in  
3 said linked list.

1 27. (Original) The apparatus of claim 22, wherein said queue  
2 comprises an assembly area for assembling a communication associated with a  
3 first type of receive traffic.

1 28. (Original) The apparatus of claim 27, wherein said assembly area  
2 comprises a portion of said queue delimited by said head pointer and said next  
3 entry pointer.

1 29. (Original) The apparatus of claim 27, wherein said first type of  
2 receive traffic is an InfiniBand RDMA Read command comprising a set of  
3 RDMA read descriptors configured to identify the communication associated with  
4 said first type of receive traffic.

1 30. (Original) The apparatus of claim 29, wherein a second type of  
2 receive traffic is an InfiniBand Send command configured to encapsulate the  
3 communication associated with said second type of receive traffic command.

1 31. (Original) The apparatus of claim 27, wherein:  
2 said first type of receive traffic comprises a set of descriptors, wherein  
3 each said descriptor is configured to describe a portion of the communication  
4 associated with said first type of receive traffic; and  
5 the apparatus is configured to issue read requests to retrieve the portions of

6 the communication described by the set of descriptors and assemble said portions  
7 in said assembly area.

1 32. (Original) The apparatus of claim 22, further comprising:  
2 a transmit module configured to transmit the communications associated  
3 with said receive traffic;  
4 wherein each communication associated with receive traffic is forwarded  
5 from said queue to said transmit module after the communication is determined to  
6 be complete.

1 33. (Original) The apparatus of claim 32, wherein a communication is  
2 forwarded from said queue to said transmit module by passing to the transmit  
3 module a set of pointers delimiting the communication within said queue.

1 34. (Original) The apparatus of claim 22, wherein said queue  
2 comprises a linked list of buffers within a memory structure configured to queue  
3 receive traffic for multiple communication connections.

1 35. (Currently Amended) A communication interface for tracking  
2 responses to an InfiniBand RDMA Read request, comprising:  
3 for each of one or more active InfiniBand queue pairs, a corresponding  
4 linked list, wherein each entry in said linked list is configured to include:  
5 a first and a last sequence numbers that identify a range of  
6 sequence numbers associated with expected responses to an RDMA Read  
7 request issued on the corresponding queue pair by the communication  
8 interface; and  
9 a previous sequence number, wherein said previous sequence  
10 number is a sequence number associated with a most recently received

11 response to the RDMA Read request; and  
12 optionally a link to the next entry of in said linked list; and  
13 for each of the linked lists, pointers to a first entry and a last entry in said  
14 linked list.

1 36. (Original) The communication interface of claim 35, further  
2 comprising:  
3 a retry queue configured to queue retry entries corresponding to RDMA  
4 Read requests issued by the communication interface;  
5 wherein an retry entry in said retry queue is retired when a final response  
6 to a corresponding RDMA Read request is received, said final response being  
7 identified by a final sequence number in said range of sequence numbers.

1 37. (Original) The communication interface of claim 35, further  
2 comprising:  
3 a transmit module configured to:  
4 issue a first RDMA Read request on a first queue pair; and  
5 calculate said range of sequence numbers associated with said  
6 expected responses to the first RDMA Read request; and  
7 a receive module configured to add an entry, corresponding to the first  
8 RDMA Read request, to said corresponding first linked list.

1 38. (Original) The communication interface of claim 37, wherein said  
2 receive module is further configured to:  
3 determine a sequence number of a response to the first RDMA Read  
4 request; and  
5 determine if said sequence number matches a final sequence number in  
6 said range of sequence numbers associated with expected responses to the first

7 RDMA Read request.

1 39. (Original) The communication interface of claim 38, wherein said  
2 receive module is further configured to:  
3 determine if said sequence number is out of order.